ADL News

Volume 2, Issue 1 USAF Area Dental Laboratory System - 29 April 2005

Comments from the Director

Another outstanding workshop has come to pass, and according to the feedback from the critiques, it was rated by our participants as the best workshop ever! This is due to several reasons; one is the unmatched organization and hard work of the entire Peterson ADL, dedicated to developing a quality continuing education program for all attendees. Another reason is the hard work and enthusiasm of the many outstanding speakers who volunteered their time to develop and present the latest techniques and information. And finally, kudos to the Cheyenne Mountain Conference Center for providing us with the best facilities, services and support we could have received here in Colorado Springs. If you were unable to attend this year, you missed out on a great event.

We continue to progress with the Cerec inLab CAD/CAM system here at the ADL. Tom Nieting, CDT, sponsored by Sirona, recently presented an advanced training course on full-contour computer assisted design. He also introduced the new R2005 software, which has significant improvements and new tools compared to the previous version, which should allow us to expand CAD/CAM applications into our Empress line of restorations and veneers very soon. To date, we have been milling the entire InCeram product line with this technology, and have extensive capacity to manufacture more for the entire Air Force with the resources we have here at Peterson. If you are still making the cores by hand at your base lab, you are significantly underutilizing your time and skills. Contact our All-Ceramics section and find out how this technology can make you more productive.

We have been testing the new VM-13 porcelain from Vident recently, and with excellent results. This is a fine microstructure porcelain designed for porcelain fused to metal restorations and has very good handling characteristics. The coefficient of thermal expansion ($13.1 – 113.6 \times 10^{-6}K^{-1}$) is compatible with Olympia and Argedent 52SF (Special) metal alloys. If you are receiving restorations from us with VM-13 porcelain, please note the lower firing temperatures required for this material. You may use Vita Akzent stains to surface stain the porcelain. The new VM line of porcelains, however, only come in 3D shades, so if you don't have the Vitapan 3D shade guides in your clinic, you may want to order some soon. This shade guide is easier, faster and more reliable to use than the Classic shade guide. We plan to replace the VMK 95 porcelain with VM-13 for our entire porcelain fused to metal product line by this summer.

To all of the NCOICs and Laboratory Officers of Base Dental Laboratories, please review your cases before you ship them to the ADL and ensure that all submission standards are met. Many BDLs continue to ship incomplete laboratory cases to us, which creates unecessary communication and manufacturing problems, adding days to the overall cycle time for the patient. This will become more critical as we head into our busiest time of the year. Everyone must do their part to ensure submission standard compliance...it is in the best interest of our patients!

RANDALL C. DUNCAN, COL, USAF, DC
Peterson Area Dental Laboratory Director

In This Issue

Tissue Management and Impression Technique for Fixed Prosthodontics: Common Problems and Solutions

Lt Col Joe Villalobos

Successful fixed prosthodontic restorations are dependent on an accurate chairside recording of carefully executed tooth preparations and surrounding tissues. The information is transferred from clinic to the laboratory where the patient's intraoral hard and soft tissues are replicated. This critical transfer of information is accomplished via an elastomeric dental impression; the "*cornerstone*" of communication between the dentist and dental laboratory.

Impression materials rank among the finest dental materials available. Polyvinylsiloxane, in particular, has had the greatest impact in dentistry. Unsurpassed accuracy, fine-detail reproduction, dimensional stability (allowing delayed pouring), and superior elasticity (which allows for multiple pours), are just some of its well-known physical properties. Unfortunately, improper handling and technique diminish its high potential for success. Our previous ADL Newsletter (5 November 2004, vol. 1) presented a "Restoration-Based Approach to Tooth Preparation for Predictable and Profitable Fixed Prosthodontics." This issue continues the goal towards successful and predictable fixed prosthodontic restorations, by addressing soft tissue management and the final impression procedure. Seven common problems which lead to poor impression results are listed, along with solutions for each problem. A sound impression technique which will yield consistent results is described.

Common Problems

1. Poor Tissue Health: Fixed prosthodontic procedures are too often initiated prior to, or in the total absence of, periodontal therapy. Inflamed, hemorrhagic gingiva will prevent adequate impression making and untreated periodontal disease will lead to poor esthetics and early failure of fixed restorations. **Solutions:** *Fixed prosthodontic treatment should only be attempted on teeth whose surrounding periodontium is free of inflammation.* At the initial visit, perform a thorough periodontal evaluation and diagnosis; oral hygiene assessment; and educate patient regarding the importance of gingival health. Perform appropriate periodontal therapy with specialty referral when necessary.

Fig. 1. Apical overextension of crown restoration and violation of epithelial attachment; note significant inflammation, spontaneous bleeding and attachment loss.

2. Excessive Subgingival Placement of Restorative Margins: Acceptable impressions are almost impossible when preparation margins are placed in too close proximity to the epithelial attachment. The detrimental effect of subgingival crown margins on the periodontium is well documented (Fig. 1). **Solutions:** 1) *Keep margins supragingival whenever possible.* This makes impression procedures significantly easier, but more importantly, gingival health is preserved. 2) *Use all-porcelain facial margin.* A metal collar necessitates subgingival placement to satisfy esthetics. An all-porcelain facial margin placed supragingival or at the level of the gingival crest, eliminates the need to extend into the sulcus (Fig. 2). Note that the disappearing margin design is no longer prescribed due to poor margin adaptation, roughness and overcontour at the cervical aspect. 3) *Surgical crown lengthening.* If margins must extend into and violate the epithelial attachment, periodontal therapy prior to restorative treatment is indicated. (Fig. 3).

Fig. 2. Use of an all-porcelain facial margin eliminates the need to extend preparation into the sulcus; note healthy gingival response.

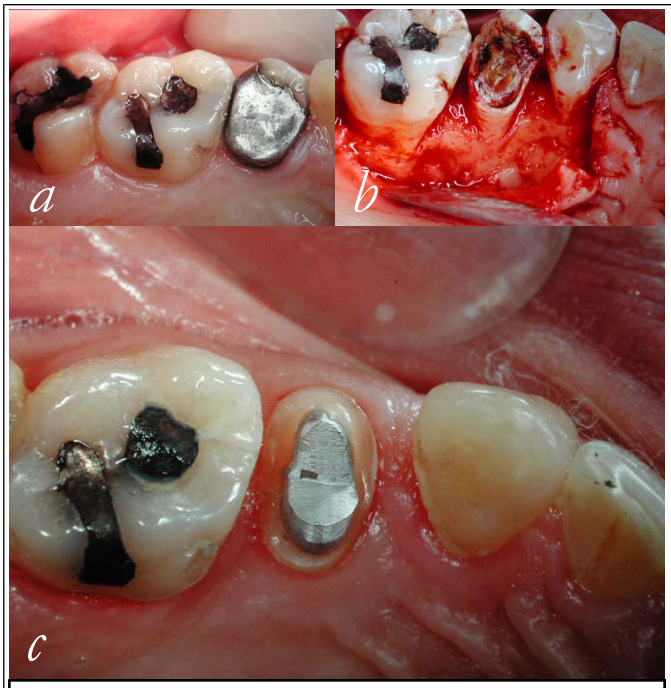

Fig. 3. (a) Short clinical crown with large restoration before periodontal crown lengthening procedure. (b) Osseous recontouring may be necessary to keep margins out of epithelial sulcus. (c) Subsequent crown preparation with margins placed at the gingival crest level.

3. Inaccuracies and Voids in Impression Caused by Blood: An ideal impression site is hemorrhage-free. Inadvertent or intentional cutting of gingival tissue during tooth preparation should be avoided. **Solutions:** 1)*Atraumatic technique.* Careful soft tissue manipulation during tooth preparation, gingival retraction, final impression and provisionalization are essential. Use hand instrument to deflect and protect gingival tissue while preparing and refining margins. Avoid abusive force when packing cord. 2) *Use small cord to protect epithelial attachment during preparation.* If preparation must extend into the sulcus, a minimum 0.5 mm space between restorative margin and junctional epithelium is needed. A small, unmedicated cord protects and acts as a cutting guide to help establish the depth of the gingival margin. 3) *Chemical agents.* The following are good choices: aluminum chloride (Hemodent) – for minimal to moderate bleeding; ferric sulfate (Astringident) - moderate to heavy bleeding; both agents can be placed via retraction cord. Quick and effective hemostasis can be achieved with ferric sulfate by rubbing the solution directly onto bleeding site with a cotton pellet or special applicator. Rinse thoroughly prior to impression (Fig. 4).

4. Inadequate Moisture Control: Contemporary polyvinylsiloxanes are modified with intrinsic surfactants

Fig. 4. Armamentarium for tissue management: Hemodent, Astringedent, Ultrapak cords #000, 00, 0, 1, and 2 sizes, cotton pellets, dappen dish, and Astringedent applicator.

and are advertised as hydrophilic. Although the polymerized impression is easier to pour, the term hydrophilic incorrectly implies that impressions can be made in a wet or moist environment. Contrary to manufacturer claims; moisture control remains a vital factor for predictable success. **Solutions:** 1) *Create a clean, dry impression field.* For fluid control and complete isolation, use cotton rolls in buccal/lingual vestibules; Dri-Angle absorbent wafers to block parotid glands; and gauze, all placed bilaterally. Control pooling of saliva with vacuum attachments (saliva ejector, high-volume, Svedopter). 2) *Use cheek retractors for better access and visualization.* Cheek and lip retraction will expose tooth preparations, allow visual access and improve control of the entire impression procedure, including tray placement. 3) *Utilize auxiliary personnel.* Difficult cases may require extra help for tongue, lip/cheek retraction or saliva control. Additional help when needed will yield better impression results.

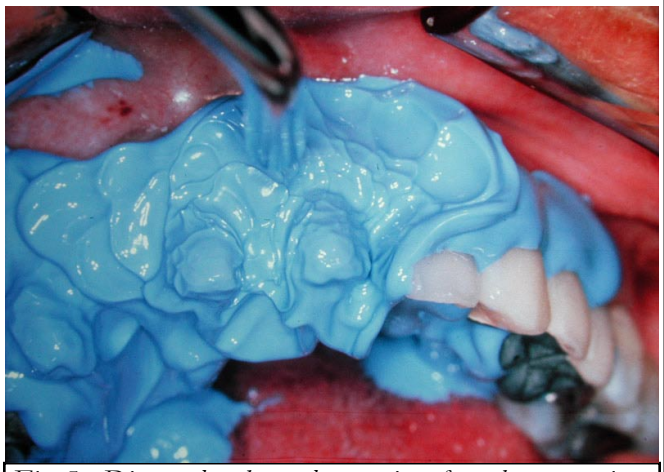

Fig. 5. Dispersal and complete wetting of tooth preparations with light-body impression material using air syringe in "blow-down" technique.

5. Air Bubbles in Critical Areas of Impression: The main limitation of polyvinylsiloxanes is their hydrophobic nature. **Solution:** Consistent, bubble-free impressions are possible using the *"Blow-down"* technique: Cut syringe tip to enlarge opening for better flow. Apply light-body impression material around the finish line (keep tip buried and push the material ahead of tip to avoid incorporating air bubbles). Use air syringe and blow down initial layer to force it into the sulcus and to overcome surface tension that resists flow of the material. Inject a second layer of light-body material and cover preparation. Assistant should meanwhile, begin loading tray. Blow down again, dispersing and thoroughly wetting the tooth and gingival sulcus (Fig. 5). Ensure all surfaces are covered. Inject around preparation a third time and continue injecting light-body material over all occlusal surfaces within the arch. Carefully seat the loaded impression tray.

6. Failure to Capture Adjacent Teeth and Soft Tissue: During impression procedures all focus is centered mainly on the tooth preparation. Consequently, important information provided by adjacent teeth and surrounding soft tissue is often overlooked. Occlusal surfaces, captured in full and free of distortion, are critical for accurate articulation of casts. In addition, vital reference information provided by adjacent and contra lateral teeth allow technician to match tooth contours, surface texture, and obtain symmetry within the arch. **Solutions:** 1) *Proper tray selection.* The tray should extend over all the teeth, as well as: retain, support, and confine the impression material. Distal molars are a common problem area. Voids in the impression, or areas "pulled away," are due to material flow away from the tooth surface, especially when open-ended "stock" trays are used. 2) *Load sufficient tray material.* The assistant should load the tray approximately three fourths the height of the tray to ensure sufficient volume for complete coverage. 3) *Extend light-body impression material onto occlusal surfaces.* Maximum accuracy is essential for proper articulation of casts and replication of functional movements.

7. Contamination from Latex: Sulfur contaminants found in latex rubber products are known to inhibit polymerization of polyvinylsiloxane. Teeth, gingival tissues and retraction cord contaminated by latex gloves prior to impression procedures are the likely cause of many failed impressions. Contamination, which is limited to the most superficial layer, may account for many fuzzy and unclear stone casts and dies seen in the dental laboratory. **Solutions:** *Use vinyl or other non-latex gloves exclusively during prosthodontic appointments involving polyvinylsiloxane impressions.* Cleanse preparations and soft tissue prior to impression procedure. Always inspect impressions closely under magnification prior to laboratory submission.

Impression Technique

1. Use a custom tray. Paint with appropriate adhesive, extending 2-3 mm onto external surface of tray flange (apply at the beginning of the appointment for sufficient drying time). *Proper tray selection will maximize the excellent properties of polyvinylsiloxane impression materials. Rigidity, reduced volume, uniform thickness, proper fit and patient comfort all make custom tray an optimal choice.*

2. Prepare automix syringes. Ensure both barrels of cartridges are clear by expressing a small amount. Attach mixing tips. Light-body for wash material, medium or heavy-body for tray.

3. Finalize preparation and cleanse. Isolate and establish clean dry field. Soak 000 cord in Hemodent, blot excess and gently pack below the margin (3-0 silk suture may also be used) (Fig. 6). This cord is left in place during impression to control hemorrhage and gingival fluid.

4. Choose a second larger cord, treat with Hemodent as above and place over small cord. Astringident is compatible with Hemodent and may be used to control persistent bleeding areas directly. If Astringedent is used, thoroughly wash away excess coagulation. Leave large cord in place 8-10 minutes (Fig. 7).

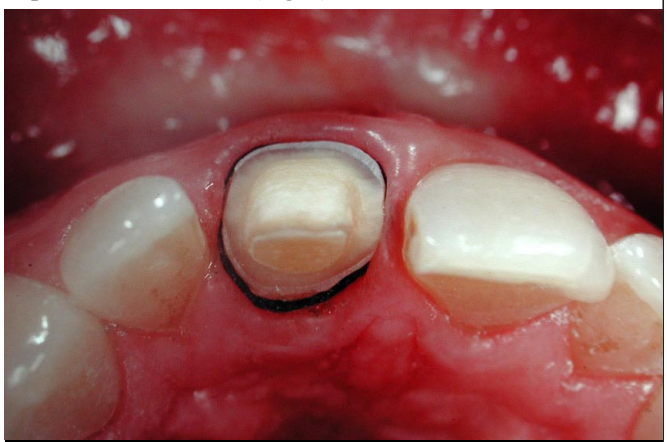

Fig. 6. Double-cord technique: first cord (size 000) placed below finish line protects periodontium, controls crevicular fluid and provides vertical access for impression material.

5. Moisten top cord, gently remove (dry removal may cause bleeding) and assess hemostasis. If bleeding

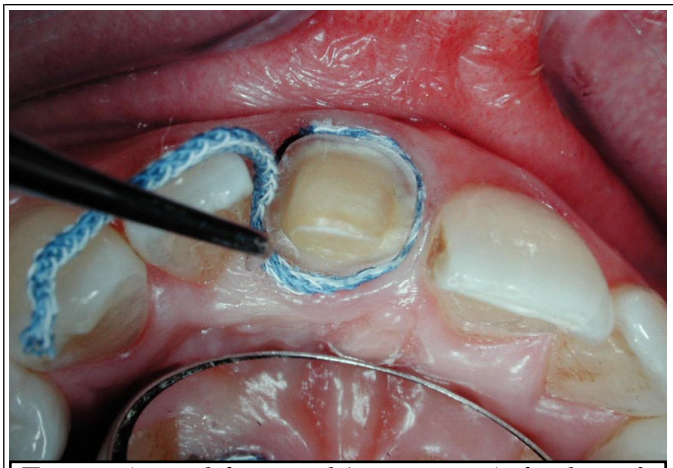

Fig. 7. A second, larger cord (size 0, 1, or 2) placed over the first cord, will expand the gingival sulcus providing access to the finish line, as well as horizontal volume of impression material. This cord is removed prior to making the impression.

is present, control as above, repack cord and wait 8-10 minutes. Do not proceed until bleeding and moisture are controlled.

6. Upon removal of top cord, rinse thoroughly and dry. Ensure 360 degree visualization of margins. Evaluate saliva control. Proceed with "Blow-down" technique described.

7. Carefully seat loaded tray to place and remove cheek retractors. Light, steady pressure is maintained by the dentist. Allow no movement of impression tray while material is setting.

8. Add one extra minute to manufacturers recommended setting time. This will ensure sufficient elasticity for resistance to deformation upon tray removal, along with maximum tear strength.

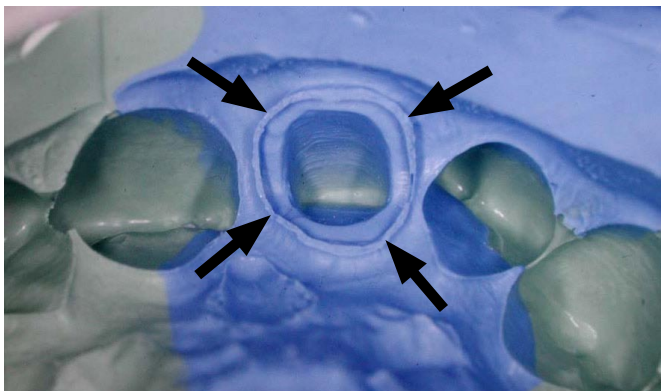

Fig. 8. Inspect the final impression under magnification. Note vertical extension of impression material below finish line of preparation. Thickness of impression material around the margin provides resistance to tearing and limits distortion.

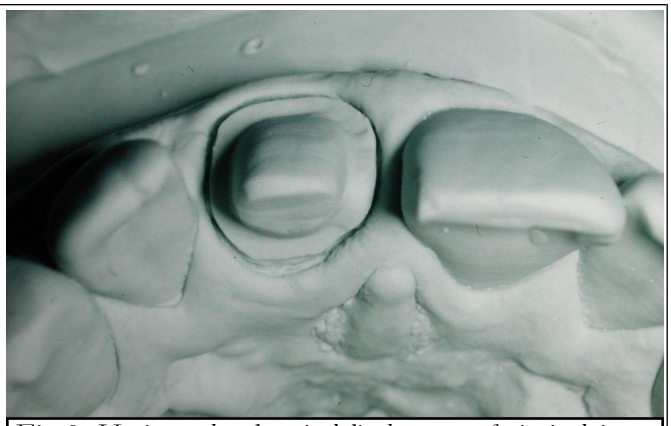

Fig. 9. Horizontal and vertical displacement of gingival tissues will allow clear replication of restorative margin.

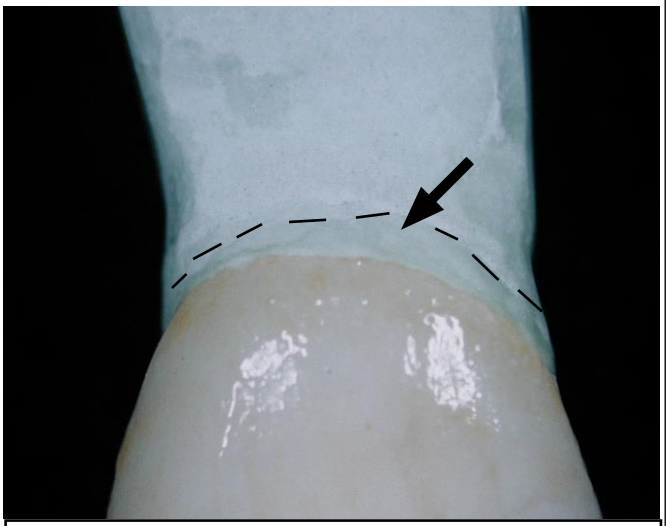

Fig. 10. Exposure of uncut tooth apical to the finish line allows accurate replication of natural emergence profile on the die.

9. Remove impression tray with a quick snap. Rinse, dry and inspect under magnification. Look for completeness and reproduction of fine detail especially around margins (Fig 8).

The final impression must accurately record, and subsequently produce, a cast that clearly and precisely reproduces the patient's prepared tooth and surrounding tissues. The laboratory can then accomplish an esthetic restoration with a natural emergence profile, which will promote and maintain gingival tissue health. Successful and predictable impressions are possible when the seven common problem areas presented are addressed and mastered.

Chief's Comments

CMSgt Dan Elfring

Hello again from the clear view picture window of Pikes Peak. I appreciate every opportunity to share with you what is going on in the career field and what direction we are headed. This is good timing because we will be meeting in a couple weeks to make any necessary changes to the CFETP. I would like to solicit one last time any input you have. I can't stress enough how important this one document is because it affects your CDC's, SKT test, and what caliber of graduate you receive from the schoolhouse. Since this is only done every three years, we need your input now. Please send me any and all feedback you have concerning the CFETP.

Some of you may have heard we plan to go back to the old CLV accounting system. This is true. We hope to have it in place by this October. Once you understand CLVs, it gives you more information about manpower requirements and proper manning authorizations. Since we are performing a major look at lab manning across the Air Force, we have been converting all the DLWV data back to CLVs. Once in effect, local commanders and NCOICs will be able to set realistic production and cycle time goals for their technicians. In such a resource-constrained environment, if there are technicians who are grossly underutilized, they may be moved to where they can be fully utilized. You can read more about the CLVs in the IPT report on our website, under Library, Laboratory IPT Report, Attachment 9.

Another major activity going on right now is the revision of the Dental Management Guide. If you have any input for this, please send that to me as well. See, there are plenty of opportunities for people to get involved and make an impact on the whole career field. It just takes some time and effort. I have found that those who have gone above and beyond to make a difference where it counts, good things have happened. Are you willing to do what it takes?

I have been trying to keep a current distribution list of all Lab NCOICs so when I have a hot topic to get out, or have a pearl of wisdom (trust me I won't overload your system), or I just want to tell everyone what a beautiful day we're having in Colorado, I can get it out to everyone. As you might imagine, this isn't easy to maintain with all the moves. If you have a new NCOIC of your lab, please have them drop me an email so I can include them in this communication effort. I will greatly appreciate it.

I will tell you that we are in exciting times right now. The Air Force, and especially our medical and dental care is changing rapidly and we must cahnge too in order to remain competitive. We must posture ourselves to provide the best dental lab support in the most fiscally responsible manner. This may mean we need to ramp up to ensure that everyone is giving their full potential. We must continue to think of how to improve our efficiencies, either with the use of new equipment, better processes, or just good time management. DCO is challenging the clinical side. We must do the same in the lab.

Another exciting example of what we are doing is looking at our supplemental courses to see if they need to be revised. I personally think they do. Why else would we have such trouble trying to get volunteers to attend? I've been to Wichita Falls for 6 weeks and had a great time. Maybe because I went for the right reason, to learn more advanced skills in the lab. Yes, I had to make sacrifices to attend. I will tell you every TDY involves some type of family or personal sacrifice. Again, good things happen to those who make it happen. If you have specific input into what you want from these supplemental courses that they don't currently provide, let me know. Wow, it seems like I'm asking for a lot of feedback from you. Fact is, if you want to get involved and make a difference and make our career field better, you have to tell someone. If you send it to me, I generally know who needs to get it to make it happen. I'd genuinely appreciate any input you might have.

Here's something we discovered from the suggestion program. We were shipping our cases FedEx Priority Overnight. That category guarantees delivery by the next day at 10:30. We started using Standard Overnight which guarantees next day by 4:30. The cost difference is about $1 per pound and we noticed no degradation of service. If you are using FedEx, I would ask you to check and see what service you are using. We recommend using Standard Overnight. It is more cost effective.

Does time fly by for you like it does for me? If you've been at your base over 3 years, have you asked yourself, what have I accomplished here? What did I set out to achieve this tour? This may be a good time for a vector check. Make some new goals or revise your old ones, write them down, and Git-R-Done!

DAN ELFRING, CMSgt, USAF
Peterson Area Dental Laboratory Manager

Stabilized Master Casts from Triple Tray Impressions

by Mr. Terry Winn, SrA Joel Jalomo, SrA Tracy Roberts

Triple tray impressions are a problematic type of fixed prosthodontic impression to work with in the dental laboratory. The name "triple" is derived by the function of the tray: containing two half-arch impressions along with the occlusal registration. The most common error encountered with the triple tray is an incorrect occlusal registration. Unfortunately, the accuracy of the occlusal registration is very dificult to verify at the time it is made, and the first verification opportunity the doctor has is during the clinical try-in. Also, due to the small size of the casts utilized (one-half of the posterior dental arch and one-third of the anterior dental arch), there can be many mounting errors incorporated into the process. Ultimately, the accuracy of your occlusal registration and mounting process is indirectly proportional to the amount of occlusal adjustment time required to deliver the restoration. Therefore, if you are experiencing a significant amount of clinical occlusal adjustments with the triple tray procedure, then you may need to examine the processes you and your laboratory employ to make and mount the casts. We will describe a process for accurately mounting triple tray casts onto an articulator. The following are advantages to this particular process: captures the exact occlusal relationship established when the triple tray impression is clinically made; maintains the exact occlusal relationship of the master cast to the opposing cast throughout the manufacturing process; presents the option of adjusting the occlusal relationship before or after articulating the casts; and it provides a definite vertical stop in the anterior and posterior area of the casts.

Fig. 1. A triple tray impression as received at the ADL. Note the lack of contact between the arches; this impreesion/ registration must be remade.

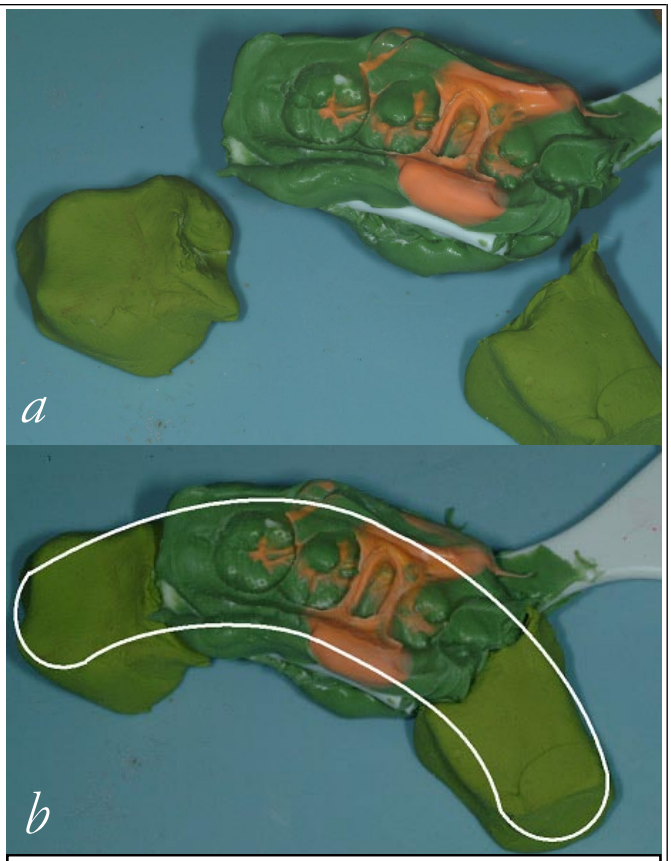

Fig. 2 (a). Place impression in a ticene matrix, making sure to create a reproducable seat. (b) Follow the curve of the arch.

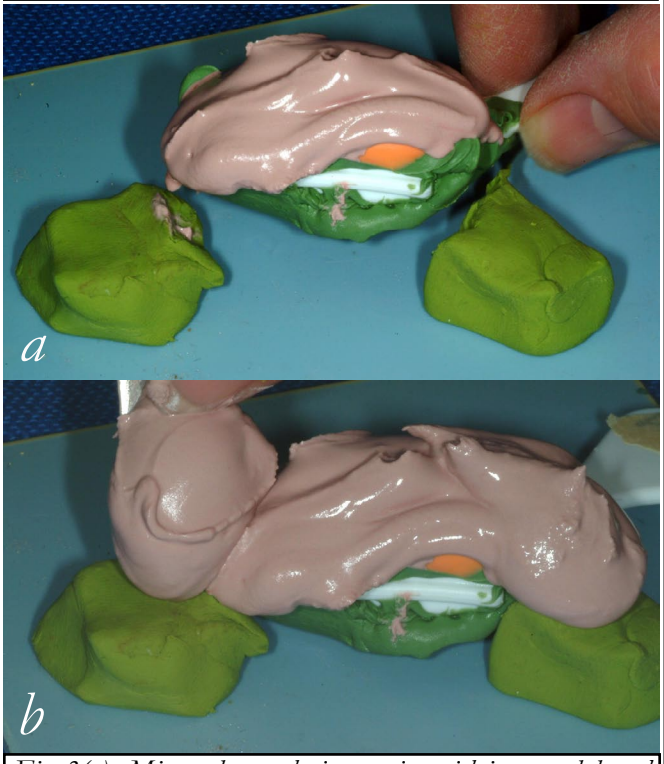

Fig. 3(a). Mix and pour the impression with improved dental stone as usual. (b) Reposition tray between the ticene matrices and immediately extend the stone over the ticene.

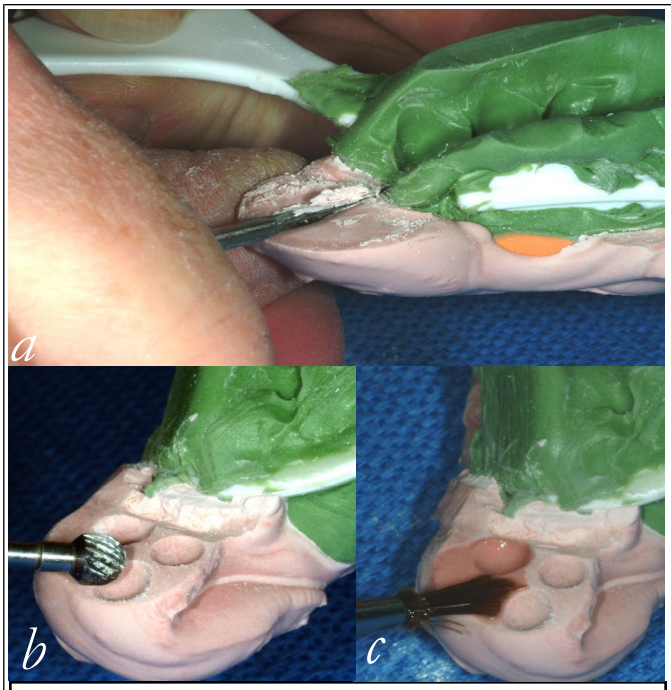

Fig. 4(a). After the die stone sets, flatten the "extention" areas with a lab knife. (b). Place index keyways on each end of the stone extension areas, and apply stone separator (c).

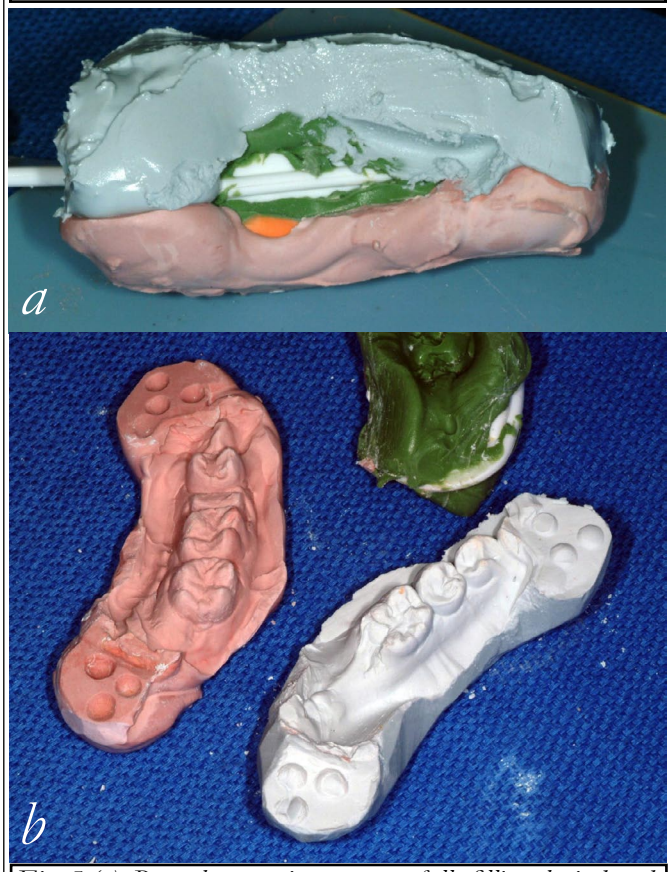

Fig. 5 (a). Pour the opposing cast, carefully filling the indexed keyways on each end, creating keys for orientation. (b). After the stone has set, carefully remove the casts from the impression, trim, and verify the fit of the indices.

Fig. 6. Pindex and base the master and opposing casts as usual, with additional pins placed into each indexed area (these should be removable).

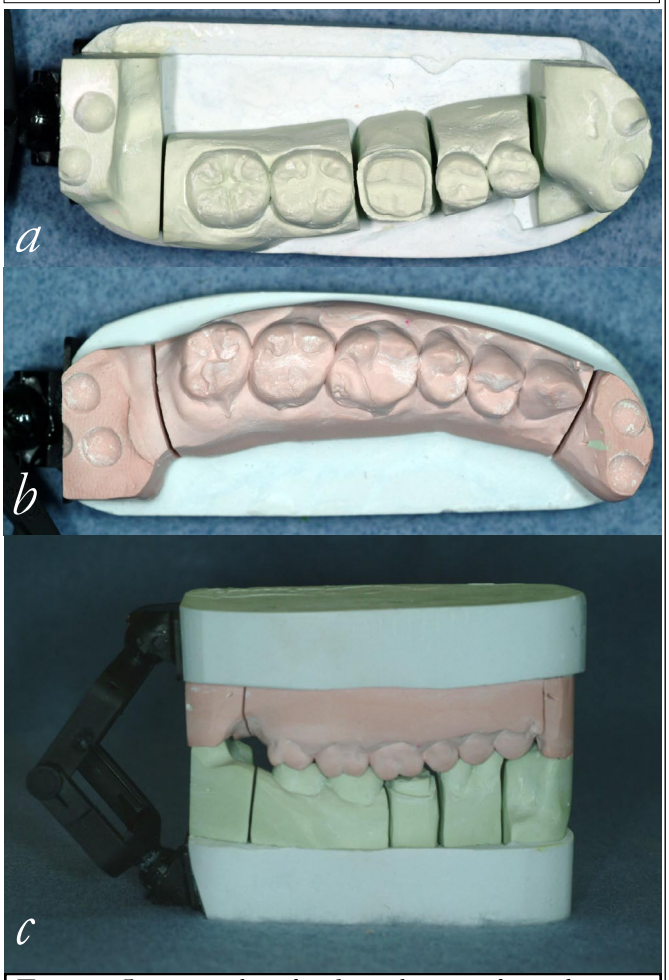

Fig. 7. Casts may be related together exactly as they were within the triple tray impression. (a) Master cast with keys. (b) Opposing cast with keyways. (c) Examine occlusal contacts of mounted casts, and compare with an occlusal verification registration. If occlusal contacts do not match, then the impression/registration must be remade.

Hails and Farewells

Peterson ADL

HAILS:

A1C Angel Gonzalez from Sheppard AFB
SSgt Benny Windom, Jr. from Sheppard AFB
SSgt Carlos Isaac from Sheppard AFB
SSgt Jamie Reed from Keesler AFB
SSgt Kendra Humphreys from Ramstein AB
SSgt Shellie Black from Brooks AFB
TSgt Arthur Figeroa, Jr. from Lackland AFB
TSgt Jeffery Rykhus from Aviano AB
TSgt Jesus Herrada, Jr. from Lackland AFB
TSgt Marie Hinkle from McGuire AFB
TSgt Robert Henson from Minot AFB
TSgt Stacy Grice from Ramstein AFB
MSgt Brian Hinkle from McGuire AFB
MSgt Allan Johnson from MacDill AFB
MSgt Elisha Cumbie from Kadena
MSgt Michael Cumbie from Kadena

FAREWELLS:

SrA Michael Lamb to Langley AFB
SSgt Maripi Whitman to Kunsan
SSgt Jennifer Rinnels to Sheppard AFB
TSgt Michael Rinnels to Sheppard AFB
TSgt Jay Mclaren to Charleston AFB

CONGRATULATIONS!

Peterson ADL

QUARTERLY AWARDS:
4TH QTR 2004

SrA Joel Jalomo – Airman, ADL
TSgt James Swihart – NCO, ADL
MSgt Eugene Fisher – SNCO, 21 ADOS
Patricia Murphy – CIV Cat 1, 21 ADOS

1ST QTR 2005

SSgt Brian Madison – NCO, 21 MDG
MSgt Wesley Schlauch - SNCO, 21 ADOS
MSgt Daniel Sierra - SNCO, 21 MDG
Donald Meaney - Civ Cat 2, 21 MDG, 21 Space Wing, and "Team Pete" Award

2004 ANNUAL AWARDS:

SrA Valerie Castillo - 21 ADOS Airman of the Year and AFSPC Airman of the Year
Donald Meaney - 21 ADOS Civilian of the Year, Civilian Category 2
SMSgt Leo Chaney - 21 ADOS SNCO of the Year and AFSPC SNCO of the Year

SHINING STAR AWARD:

Oct 04: Support Team - Ms. Jardin, Mrs. Murphy, TSgt Carlson, TSgt Lewis, A1C Funke and alternates MSgt Alcantara, TSgt(s) Stellabotte, SSgt Ellis, SSgt Fitzpatrick, MSgt Czupryna and SSgt Whitman
Nov 04: SrA Joel Jalomo
Dec 04: TSgt Salazar
Jan 05: MSgt Brian Hinkle
Feb 05: TSgt Marie Hinkle
Mar 05: A1C Xiao Ren

TOP TECHNICIANS OF THE AIR FORCE 2004

MSgt Keith Weinheimer, 7-9 Skill Level Category, Lackland AFB
A1C Teresa Neasbitt, 3-5 Skill Level Category, Moody AFB

TEAM LEADERS:

Fixed Dept. NCOIC:	MSgt Eugene Fisher
Removable NCOIC:	MSgt Elisha Cumbie
Quality Control NCOIC:	TSgt James Swihart
Wax-Metal Team:	MSgt Olen Moore
Wax-Metal Team:	MSgt Mike Cumbie
Porcelain Team:	MSgt Wesley Schlauch
All-Ceramics Team:	MSgt Robert Czupryna

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